distinguish between an adenoma causing hyperthyroidism and one not causing hyperthyroidism.

4. The average time elapsing between the discovery of an adenoma and the appearance of the symptoms of hyperthyroidism is 15 years.

5. Iodine therapy, of marked benefit in the treatment of colloid goiter, is not only worthless but actually dangerous in adenomas.

6. Enucleation or subtotal thyroidectomy performed before serious myocardial damage has occured is the rational treatment, and can be relied upon to effect a cure in practically one hundred per cent of the patients.

7. Operation should not be advised except for the relief of toxic or mechanical symptoms or cosmetic effects within three to five years after the discovery of the adenoma.

Is Public Health a "Merry-Go-Round"?—In recent years the people as a whole have come to take a decided interest in matters pertaining to health. This interest has continued to increase until innumerable so-called voluntary health organizations have sprung up and continue to multiply all over the country. Anti-tubercular, anti-venereal, child welfare, maternal welfare, family welfare, baby welfare—in fact, a more or less free fare and invitation to every one to join one of these groups on the free road to health. The prenatal clinic cares for the baby in the mother's womb and guides it into a hostile world. It is received in the motherly lap of the baby welfare clinic and tenderly cared for. It receives its nourishment from the warm and hygienic bottle prepared in the baby milk laboratory. Its tottering steps are guided by the helping hand of the child welfare society. In due time the child enters school and he is welcomed on the threshold by the school nurse and introduced to the school physician. He is vaccinated against smallpox, inoculated against typhoid, is given the Schick test and becomes immune to diphtheria. His teeth are looked after at the dental clinic, and his tonsils and adenoids removed at some hospital out-patient department. His eyes are examined and possibly fitted to glasses, and thus equipped and prepared he at once starts to do his health chores. Found underweight, he enjoys for a time the luxury of an open-air school under the supervision of the nurse and physician of an anti-tubercular association. Thus he is guided through school and may take a chance at college. If he here escapes for a moment from his guardians and falls into evil ways there are free clinics provided even for these emergencies.

Safely passing his health inspection and eugenic society wedlock is entered. In due time his wife becomes an attendant of the maternal welfare clinic. His health is guarded by his periodic health examinations. He is looked after at his work by the industrial nurse and prescibed for by the industrial physician. If sick at home he has the care of the visiting nurse and the social worker. His future is provided for by his industrial insurance and old age pension. In his declining years he enters some rest home for the aged. His dying pillow is smoothed by the institution nurse and his room brightened by the home visitor. Some burial society looks after his funeral. At last he lies at rest after a long and pleasant journey along the free health road. Even heaven has been made secure, and the ministering angels will continue to guard him through all eternity. An ideal to strive for, a pleasant journey. We wish him well.—Maine Medical Journal.

POST-TONSILLECTOMY PULMONARY ABSCESS *

By MARY E. BOTSFORD, M. D., San Francisco

Is anesthesia responsible for the increase in the number of post-tonsillectomy pulmonary abscesses reported in the medical press? A famous attorney has spoken of the anesthetist as the accessory before the crime and the burden of proof may often, as in the present discussion, rest upon us.

Oral surgery represents a large proportion of the operative procedures of today and if the apparent increase in the number of pulmonary abscesses following them be due to the anesthetic per se, then it behooves us to seek the remedy, either in a perfected techique or in recommending the substitution of local for general anesthesia in a larger percentage of cases.

Briefly stated, the chief causes considered by the various observers are divided into antecedent and operative. The former, those due to pre-existing, local or general conditions, such as tuberculosis, etc., and the latter, directly due to the surgical procedure. The first of these, while being recognized as a possible factor, is generally considered to be infrequent, because of the usual routine physical examination and the fact that tonsillectomy, being an operation of selection, is rarely done except with the patient in favorable physical condition.

In these cases, the role of the anesthetic and the question of its choice would depend upon the general condition.

The earlier investigators lay much stress on the possibility of severed veins remaining patulous following the operation and permitting the entrance of septic blood clots. Their argument is based on the close association of the tonsillar area with the lung through the lymphatic and vascular circulation, and the opportunity for pathogenic bacteria, liberated during the operation, being forced into the circulation. The embolic origin through the diaphragm of many of the so-called post-operative ether pneumonias, has been definitely proved in cases of septic abdomen and undoubtedly infected emboli may travel to the lungs from above downward.

A review of the literature, covering a period of eight years, tends to align all observers who favor the operative causation into two groups—those who hold that metastatic emboli are the cause and those who give precedence to the aspiration theory. If the former were demonstrably correct, anesthesia might be acquitted, but as a matter of fact the preponderance of evidence favors the latter theory, and its proponents are largely in the majority.

L. Fisher and A. J. Cohen, (1) in the Section on Laryngology, Otology and Rhinology, at the last session of the American Medical Association, in reporting seventy-six post-operative pulmonary complications, seventy-two occurring in adults, concluded from the study of these cases—seventy-four of the number having been operated under general anesthesia—that the most probable cause (while

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admitting the feasibility of direct aspiration) is the introduction through the lymph or vascular channels of infected emboli. They offer as a solution the substitution of local for general anesthesia in all adults.

E. C. Cutler (2) bases his argument in favor of embolic origin of all pulmonary post-operative complications mainly on the fact of their occurrence under local as well as general anesthesia.

C. W. Richardson (3) states that although at one time of the opinion that the causes of lung abscesses are embolic, either vascular or lymphatic, he now believes that if not entirely, they are in part due to the aspiration of septic material, which is squeezed out of the tonsil at the time of operation.

A. H. Herr (4) considers that abscess of the lung after tonsillectomy is rarely due to metastasis, but to aspiration of septic material.

Willy Meyer says (5) "It is my belief that almost every case of sub-acute lung suppuration is due to aspiration of either solid, semi-solid or fluid material; also that abscess formation following pneumonia is usually due to aspiration of mucopus. Regarding liquids, there may be stomach contents, aspirated during general anesthesia or gastric lavage; blood, resulting from tonsillectomy and other mouth and pharyngeal operations; pus or mucopus, as during pneumonia, and infected water as in swimming."

C. C. Coakley (6) decides in favor of aspiration as the etiologic factor, arguing that embolism or infarct would produce a condition simulating pneumonia with gangrene supervening. It would suggest multiple foci of infection with general consolidation as probably due to infection reaching the circulation through the plexus of veins and capsule of the tonsil.

L. Clendening (7) considers all single abscesses due to aspiration of infective material and finds (8) lobar pneumonia responsible for less than 2 per cent of reported lung abscesses.

H. L. Lynah (9) calls attention to the fact that an embolic abscess is usually the manifestation of a general pyemic process involving many areas in the lungs, such as are found generally in post-partum sepsis, and are usually rapidly fatal. The very fact that he sees many of these cases in the clinics points strongly to the simple cause of aspiration as the chief etiologic factor in the production of pulmonary abscesses.

H. Lilienthal (10) in reporting thirty-one cases of resection of the lung for suppurative infection, states that "the commonest cause of the disease is infection due to the aspiration of septic materials during tonsillectomy."

P. W. Aschner (11) describes bronchiectatic abscess as a localized suppurative process in the course of a bronchus and thus far observed only in post-tonsillectomy cases.

I. Frank (12) C. B. Walker (13) and I. W. Voorhees (14) hold similar views.

If, as the foregoing evidence would seem to prove, we must look to aspiration of infective material during tonsillectomies as the most frequent cause of these lung abscesses, what is the role of the anesthetic?

C. R. C. Borden (15) strikes the keynote of the logical explanation of the responsibility of the anesthetic when he says: "If anesthesia is carried to the point of abolishing all throat and lung reflexes, the natural protection of the lung cavity is gone." The mechanism of this reflex action he describes thus: "Stimulation of the sensory fibres in nasal mucous membrane causes an inhibitory action of respiration which protects the lungs from irritating and injurious gases and against too strong ether vapor. Stimulation of the glosso pharyngeal nerve in the pharynx produces arrested respiration and a closure of the cords during the act of swallowing. Stimulation of the superior laryngeal nerve of the larynx closes the glottis by contraction of the adductor muscles and it also produces temporarily suspended respiration or cough."

The condition when the reflexes are abolished is then described:

"The larynx is partly open, cough is no longer available, the bronchi are dilated to their widest extent and the smallest bronchi are open pathways to the minute bronchioles and alveoli. No reflex connected with the throat or lung can hold for a given time against the expiratory center in the medulla oblongata. When sufficient CO_2 accumulates in the blood to stimulate this center, all forms of reflex, which cause suspended respiration, become inactive. When the respiratory center sends forth its stimulation, inspiration will be sudden and deep. The greater the need for air, the deeper and more powerful will be this movement. Violent indrawing of the breath we call a gasp; it may occur at any stage of etherization, but is more apt to occur when anesthesia is light. It is specially likely to occur when strong ether vapor is present because of the reflex fixation of the cords. If foreign matter is near the entrance to the larynx at this time, it is reasonably sure to be drawn through the glottic opening and carried to the large air passages. Sudden inspiration of blood clots and thick mucous is a most dangerous occurrence. The inrushing air may carry the foreign material into the deeper channels of the lung where the cough reflex will be too feeble to expel it. Once wedged into a small tube, contraction and edema would soon occur and no available force could expel the foreign body. If septic material is present, abscess formation or pneumonia will doubtless result."

Anesthesia maintained at a stage which stops short of completely abolishing the laryngeal reflex—deep enough to prevent the gasp, yet not so deep as to inhibit coughing—will permit and favor the expulsion of any material seeking entrance to the trachea—blood, mucous or, as occasionally happens in oral surgery, detritus, sponges and even teeth.

As Chevalier Jackson aptly expresses it, "The cough is the watchdog of the lungs," and it is not for nothing in the evolution of human physiology that the laryngeal reflex is so delicate that the touch of a feather on the epiglottis will produce a cough.

Local anesthesia in preference to general cannot solve the problem, as it is not practicable in young children who furnish the largest percentage of tonsillectomies. Of sixteen cases reported in San Francisco hospital records for the past nine years, five post-operative pulmonary abscesses were in children. A further objection is the inherent danger from the toxic effects of the agent. The Committee on Local Anesthetics of the Section on Laryngology, Otology and Rhinology of the A. M. A. (16) reported twenty-seven fatalities in two years from the use of local anesthetics in nose and throat surgery and finds that deaths are vastly in excess of the number reported in the medical journals.

W. F. Moore (17) reports the largest number of pulmonary abscesses so far recorded, 202 cases in a total of 450,000 oral operations, or one abscess in 2500 to 3000 cases. To the four cases following local anesthesia previously reported in the literature he adds thirty-nine, and from the results of his questionnaire sent to 1020 laryngologists in the United States and Canada, finds that the inspiratory mode of transmission seems to be thought the most usual. He suggests that the incidence of abscesses in the local cases may be explained by the fact, established by Chevalier Jackson, that as anesthetizing the superior laryngeal nerve, which may be done by an application of an 8 per cent solution of cocaine to the lower part of the pharynx, abolishes all reflexes in the vocal cords so that they may be operated upon without producing cough, infective material may find entrance to the lungs during tonsillectomies under local, because of the inhibition of the bechic or coughing reflex, "the watchdog" being as effectually muzzled by local as general anesthesia.

The danger of the motor-driven apparatus may be obviated by standardizing the pressure. A proper ratio of the volume of air, not over 20 litres per minute, with a pressure of 30 mm. of mercury, with sufficient ether for anesthetic needs.

Some of the mechanisms which are used for suction and insufflation are regulated rather for the suction requirements than the air delivery, and it is undoubtedly true that aspiration may be caused by too high pressure in the effort of the anesthetist to deepen the anesthesia.

A grave danger of the insufflation apparatus, whether motor or foot driven, is caused by the method sometimes seen of immersing the ether container in a vessel of water, the temperature of which is not definitely controllable. There have been cases where vaporized ether, during a pause in the air pressure, condensing in the tube, has passed over in liquid form and been aspirated, with the production of pulmonary complications.

As between the motor and foot driven insufflation apparatus, the small foot bellows, operated by heel and toe movement, has several points of superiority, such as noiselessness (most of the motors are loud enough to drown the respiratory sound), a pressure low enough to merely deliver the vapor into the mouth cavity, which is all that it should do, and ease of regulating air pressure without withdrawing attention from patient.

Whatever posture be required by the individual surgeon's technique, the anesthetist should be responsible for that immediately following the operation and until the patient is properly placed in bed. Particularly in children where some adenoid bleeding invariably persists for a longer or shorter time, the correct posture is a modified Sims, care being taken not to draw the under arm backward—to prevent burying the mouth and nose—and with the upper leg and thigh flexed to maintain the position which facilitates drainage while the patient is unconscious.

CONCLUSIONS

1. The preponderance of expert opinion is that the chief etiologic factor in the production of lung abscesses following oral surgical operations is aspiration of infective material during or subsequent to the operation.

2. Anesthesia of sufficient depth to abolish laryngeal reflexes or so light as to cause irregular gasping respiration may be contributory.

3. Local anesthesia does not prevent their occurrence.

4. The Insufflation apparatus should not be permitted to deliver air at a greater pressure than 30 mm. of mercury.

5. Semi-prone posture post-operatively is important in prevention of aspiration.

The whole trend of modern research is in the line of defining the dangers of too deep anesthesia, and the increasing prevalence of post-tonsillectomy pulmonary abscesses may be due in some degree to a disregard of this warning.

The final criterion—the end result to the patient—is influenced by the anesthetist's skill in obtaining and maintaining the lightest degree of anesthesia consonant with the necessary surgical procedure.

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(807 Francisco Street)

What You Have Bought—"A story was once told of a man who stood on the steps of the Capitol at Washington for an hour trying to sell $10 gold pieces at $1 each, but no one would buy," says the Journal of the Kansas Medical Society.

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